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ABSTRACT

California Lutheran University's (CLU's) School of Education created Project MAGNETIC CONNECTIONS to strengthen links between teacher preparation programs and K-12 schools through real-time connections and shared learning opportunities between partners. Three technology-rich schools became laboratories for learning for CLU students and faculty, connected via distance learning capabilities to CLU students on other campuses. All students developed Web-based electronic portfolios that documented their progress through preservice education. They were taught and mentored by highly trained teacher educators and visiting scholars. The project included conferences and workshops to redesign the teacher preparation curriculum to infuse technology into teaching and learning. It used a participatory evaluation design. Higher education faculty, preservice teachers, and K-12 teachers were evaluated. Evaluation included document analysis of course syllabi, portfolio contents, and training materials; pre-post technology use surveys of faculty and student teachers; focus groups with faculty and preservice teachers; and analysis of online transcripts. Results indicated that progress was achieved in five areas: developing and maintaining K-12 partnerships; implementing a Web-based electronic portfolio system; providing professional development for teacher educators; implementing the use of distance learning technologies; and revising the teacher preparation curriculum to infuse technology. (Contains 20 references.) (SM)

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Project MAGNETIC CONNECTIONS: Infusing Technology into California Lutheran University's Preservice Teacher Preparation Program

A paper presented at the American Association of Colleges for Teacher Education (AACTE) Annual Meeting, March 1-4, 2001, in Dallas, Texas

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Abstract: Technology provides opportunities to link students, faculty, partners in education, and the wider communities together to expand, improve, develop, and enhance the learning experience for all. It is this challenge that has led California Lutheran University's (CLU) School of Education to conceive and implement Project MAGNETIC CONNECTIONS. Progress on the project can be measured through five major activities. These activities include (1) strengthening partnerships with K-12 schools, (2) use of an electronic portfolio system, (3) conducting faculty development workshops, (4) use of distance learning technologies, and (5) revision of the Teacher Preparation Program curriculum. Results indicate that CLU is better preparing preservice teachers to use technology in teaching and learning as they are provided with better models and mentors for integrating technology into the curriculum. Preservice teachers are held accountable for meeting state and CLU standards for beginning teachers through the use of a web-based electronic portfolio system and distance learning technologies.

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Introduction

The nation's teaching force faces a critical challenge as a record number of students enter our schools. By 2008, schools will need to hire more than 2.2 million teachers to serve growing student enrollments and to replace the considerable number of current teachers expected to retire in the coming years. In California, shortages are particularly acute. Educating nearly 11% of the nation's student population, California's school enrollment is at about five million and growing by more than 100,000 students per year. California will need to hire more than a quarter of a million teachers over the next decade. (Haselkorn & Harris, 1998).

This extraordinary need for teachers comes at a time when the demands placed on teachers, particularly in California, have never been greater. Already serving the nation's most diverse population, California provides a look ahead to many of the educational and demographic challenges facing the nation in the 21st century. Like many other states, California has embraced the "standards movement" calling for more accountability for teachers, students, and schools. Therefore, at the very time we are asked to produce more teachers through a greater variety of teacher preparation routes, we are also being called upon to prepare a more capable workforce that is well prepared for the challenges and complexities of the next century.

Technology offers promise as a tool and a resource for those who prepare teachers, and for teachers themselves who are challenged to provide more and better services and educational opportunities for students. It challenges us to think about new ways to link our students, our faculty, our educational partners, and our wider communities together to expand, improve, develop, and enhance the learning experience for all. It is this challenge that has led the faculty in the School of Education at California Lutheran University to conceive the plan for Project MAGNETIC CONNECTIONS.

California Lutheran University and its school partners have already committed significant resources to developing and supporting our technology capabilities. Yet, technology itself is not pursued as an end in itself but as a vehicle and medium for teaching and learning. The Information Systems and Services unit of our university has articulated a vision statement that reads: "We build community by providing solution oriented, integrated information resources and services. Our graduates are technologically competent and competitive in a global market."

The School of Education has embraced this vision in our own strategic plan, which calls for us to infuse technology throughout all of our programs. Nowhere is this challenge more important than in teacher education.

Teacher education does not occur in isolated classrooms that are disconnected from practice. We believe that making, building, and strengthening connections are vital to the future of teacher education. CONNECTIONS between content and pedagogy, CONNECTIONS between theory and practice, CONNECTIONS across the curriculum, CONNECTIONS between the university and the schools, and CONNECTIONS between teachers and students are only some of the most crucial linkages that must be made. Technology holds promise of being a tool and a resource for making these CONNECTIONS.

There is a natural affinity and powerful draw among the participants in this project; they have common goals and purposes to improve teaching and learning for all. They have already committed to the use of technology as a vehicle for improved

instruction. These common purposes serve as a MAGNET, drawing together all of the players and the resources they bring to the table. In this project, the primary resources for linking with the real world of practice are three MAGNET schools—schools with a special focus on technology. One is an elementary school, one a middle school, and one a high school; all in different districts, and all using technology as a magnet to attract and serve a diverse student population. Therefore, we have entitled this Project MAGNETIC CONNECTIONS, in anticipation that we will build on this natural affinity to strengthen these powerful connections through the use of technology.

Many have predicted that technology has the potential to change education in dramatic ways. (Hertzke & Olson, 1994; Kent & McNergney, 1998). However, teachers often report that they are not well prepared to use even the limited technology available in most school classrooms. Even though they may know ***how*** to use the computer-based technology they find in their classrooms, they may not know how to use it for effective instructional purposes. This is not surprising, considering the history of teacher preparation program practices. Arthur Wise, President of NCATE (1998) suggests that the models provided for preservice teachers are inadequate for today's technological demands on the teaching profession.

> Despite the technology changes in society, being a teacher in American schools too often consists of helping children and youth acquire information from textbooks and acting as an additional source of expertise. Teachers are provided role models of this approach to teaching from kindergarten through graduate school; their teacher education courses provide hints for making textbook-oriented instruction interesting and productive, and as teaching interns, they both observe and practice instruction based upon mastering information found in books. Teachers may be forgiven if they cling to old models of teaching that have served them well in the past. All of their formal instruction and role models were driven by traditional teaching practices. (p.5)

If teachers in elementary and secondary schools are to use technology well, they must experience its use in their own learning. Sandholtz, Ringstaff & Dwyer (1997) indicate that students learn best about the appropriate use of technology in the classroom when they are provided with models of good practice.

As we take the necessary steps to achieve our vision for teacher preparation in the twenty-first century, our faculty identified five areas related to our human and technological resources that need to be addressed. These areas are:

- providing better teacher training in the selection, access, and use of technology in teaching and learning;
- providing better mentors and models for preservice teachers in the form of university faculty, K-12 cooperating teachers, and university supervisors, who integrate and appropriately use technology in their own teaching and learning;
- expanding the Teacher Preparation Program to reach more preservice teachers;
- developing and using new assessment models that incorporate the use of an electronic portfolio system; and

- building better linkages between subject matter, professional preparation, and K-12 schools.

The Project MAGENETIC CONNECTIONS

Although prior to beginning this project, many School of Education faculty members already used technology to deliver and enhance instructional opportunities, conduct research, and communicate with students outside of class, our own studies indicated that this use was highly idiosyncratic, largely dependent upon the interests and inclinations of the individual faculty member, course specific, and not well connected to any overall programmatic vision or initiatives. We were poised to take the next step to fully integrate technology into our program and to utilize its power to significantly change the way we prepare teachers for their work in contemporary schools when presented with the opportunity to apply for external funding to help accomplish our goals.

Project MAGNETIC CONNECTIONS is strengthening the links between teacher preparation programs and K-12 schools through live, real-time connections and shared learning opportunities between the partners. The three technology-rich schools have become laboratories for learning for CLU students and faculty and are connected via distance learning capabilities to CLU students on the Thousand Oaks campus and to its graduate centers in Woodland Hills and Ventura. All CLU students are developing a web-based electronic portfolio, documenting their progress and accomplishments as they advance through the benchmarks of the teacher preparation program. They are taught and mentored in their use of technology by highly trained teacher education faculty and two visiting teacher/scholars (clinical faculty) in residence for the duration of the three-year program.

The project includes conferences and workshops to redesign the teacher preparation curriculum at California Lutheran University to infuse technology into the teaching and learning process. We are developing and implementing an electronic portfolio system that is linked to the six domains of the California Standards for the Teaching Profession. Preservice teachers and education faculty are utilizing the new electronic portfolio system to enhance communication regarding professional expectations and preservice teacher accountability for meeting those standards.

In July 1997 The California Commission of Teacher Credentialing and the California Department of Education adopted the California Standards for the Teaching Profession (CSTP). The standards were jointly developed by the two agencies to facilitate induction of beginning teachers into professional roles and responsibilities. The standards provide teachers and teacher educators a common language and structure to describe the complexity of teaching and are intended to guide teachers as they develop their professional practice.

The standards are organized around six interrelated categories of teaching practice. In summary, they are, 1) Engaging and supporting all students in learning, 2) Creating and maintaining effective environments for student learning, 3) Understanding and organizing subject matter for student learning, 4) Planning instruction and designing learning experiences for all students, 5) Assessing student learning, and 6) Developing as a professional educator. The list is not intended to be sequential, and does not indicate priority or value among the items, but is merely numbered to facilitate identification and

discussion. The 6th standard does not describe specific classroom conduct but is more a reminder of the need for ongoing professional development and relationships.

The six categories provide a developmental, holistic view of teaching intended to serve the needs of the diverse student and teacher populations in this State. The overlap that is evident among the standards communicates the interrelationships and complexities of teaching that require continued development of professional judgment. The standards are designed to support work in diverse classrooms in a variety of ways, and not to force a single approach on all practitioners. Use of the standards is intended to stimulate reflection on practice, formulation of goals, and assessment of growth. Therefore the use of these criteria is flexible.

The Department of Teacher Education in the School of Education at California Lutheran University adopted the CSTP as an organizing principle for its teacher credential programs. Curriculum and assessment approaches are now based on the standards, with an emphasis of providing evidence of progress on the first five. Preservice teachers are held accountable for these standards through the use of a web-based electronic portfolio system. This web-based system allows students, faculty, educational partners, and education employers to expand, improve, develop, and enhance the learning experience for preservice teachers. However, reliable identification and description of student work for purposes of formative growth remains the primary purpose for the use of the state standards and the electronic portfolio system at CLU.

Implementation of a web-based electronic portfolio system throughout the teacher preparation program complements the student-centered approach CLU takes to preparing teachers for the classrooms of tomorrow. The portfolio system is analogous to a relational database that is cooperatively developed by faculty, students, cooperating teachers, supervisors and employers. It enables a grand conversation between these parties, focusing around the student's professional development. The state standards and the School of Education's conceptual framework of reflective, principled practice serve as a scaffold around which teacher educators and preservice teachers weave their dialog.

This dialog is enhanced through the use of other distance learning technologies, namely Tapped In (a Multi-object Orientation [MOO] for educators) and ClearPhone (an Internet video-phone). These two technologies are used mainly in real-time as teacher educators meet in virtual classrooms with preservice teachers, or preservice teachers tutor k-12 students through video conferencing. The electronic portfolio system tends to be used asynchronously as students respond to teacher educators' assignments and deposit artifacts supporting their growth and accomplishments as a beginning teacher. Only recently have the two technologies merged, where teacher educators are able to converse in real-time with students about artifacts in their electronic portfolio, either in the MOO or through video conferencing. There is much potential for mentoring preservice teachers online while holding them accountable for the standards through demonstrations and artifacts deposited in their electronic portfolio.

In order to meet the new performance standards and to integrate these technologies throughout the program, the teacher preparation program curriculum needed to be revised. This revision is ongoing over a three-year period, the goal is to modify course goals, objectives, and assignments to reflect the vision of our teacher preparation program and ensure that all beginning teachers have met new rigorous state standards for teaching and technology. Faculty curriculum revision efforts identified four major

considerations that will shape the revised program. These include the School of Education's conceptual framework, the state standards for the teaching profession (CSTP), the state technology standards and the cross-cultural language and academic development (CLAD) foci. Any curriculum revision must include, address and hold students accountable for meeting these state standards as well as realizing the School of Education's vision that strives to prepare principled, reflective educators. Hence, faculty and administration expect that the final revision will articulate the relationship between course goals and objectives, the School of Education's conceptual framework and the other program and state standards for teaching and technology.

Evaluation Design

The MAGNETIC CONNECTIONS Project uses a *participatory evaluation* design. This evaluation model, described by Cousins and Whitmore (1998) and Rossi, Freeman and Lipsay (1999) views program participant stakeholders as partners in the evaluation process. The stakeholders define the evaluation purpose, create research questions, design instruments, collect data and interpret and report findings. Cousins and Whitmore (1998) and Greene (1988) suggest that such participation keeps the evaluation relevant and increases utilization of findings without sacrificing technical quality or credibility. As a result, the evaluation seeks to change the organization or solve a problem, rather than simply collect programmatic information.

At CLU, the participatory evaluation used a formative/summative design recommend by Stevens, Lawrenz, Sharp, and Frechling (1997), examining five formative and one summative goal. Participants included a sample of 17 full and part time higher education faculty, all preservice teachers and K-12 teachers at three technology rich partner schools. Instruments included document analysis of course syllabi, portfolio contents and training materials; pre-post technology use surveys of faculty and preservice teachers; observation of faculty and preservice teachers, focus groups conducted with faculty and preservice teachers and analysis of on-line transcripts. Each goal was examined with at least two data collection techniques, allowing for triangulation of findings.

Results

Preservice teachers, k-12 partners, and education faculty are conducting action research on implementation strategies and distance learning ideas embedded in the project. The action research findings identify and amplify successful strategies for curriculum development, implementation and assessment. They also indicate what strategies and technologies do not work well and those that have potential, but are not ready for implementation.

Progress on the project has been achieved within five major activities: 1) developing and maintaining partnerships with k-12 schools, 2) implementing a web-based electronic portfolio system, 3) providing professional development for teacher preparation faculty, 4) implementing the use of distance learning technologies, and 5) revising the teacher preparation curriculum to infuse technology throughout the program.

1) **California Lutheran University's College of Education has strengthened partnerships with K-12 schools through many project initiatives.**

What has been accomplished?

- Teacher/scholars have been hired to support the implementation of the project objectives and the teacher preparation program faculty, preservice teachers within the School of Education and cooperating teachers in k-12 partner schools.
- A grant advisory group (GAG) has been formed from representatives within the teacher preparation program and K-12 partner schools. Five meetings were held during the first year of implementation. GAG meetings help to determine the project implementation schedule and spending priorities.
- Video-conferencing technology (ClearPhone) has been successfully used by preservice teachers to tutor K-12 students.
- The two clinical faculty have been team-teaching and working with teacher preparation faculty to integrate technology into their courses.
- K-12 faculty have contributed to the revision of 42 Teacher Preparation program courses as the School of Education faculty works to infuse technology into their teaching and learning.
- K-12 faculty have attended workshops on the electronic portfolio, Tapped In and ClearPhone.

What evidence supports these accomplishments?

The minutes of GAG meetings indicate that K-12 partner schools and California Lutheran University have collaborated on implementation initiatives and spending. Qualitative feedback from preservice teachers clearly indicated that tutoring K-12 students via ClearPhone was as effective as tutoring K-12 students in person. Data collected from the faculty focus group in May 2000 indicated that the clinical faculty has been helpful in efforts to integrate technology into Teacher Preparation program courses.

What are the plans for the future?

As a result, the project will continue to hold Grant Advisory Group meetings and rotate the meetings between California Lutheran University and each K-12 partner school. We will further develop video-conferencing connections between California Lutheran University and K-12 partner schools and expand the use of clinical faculty to include workshops and demonstration lessons in K-12 partner schools and team-teaching with preservice teachers in the Teacher Preparation Program.

2) **Electronic portfolio system implemented throughout the teacher preparation program. The system is based on the State standards for professional teacher development and provides a self-assessment tool for students as well as an opportunity for K-12 teachers and higher education faculty to mentor and advise preservice teachers throughout their teacher preparation program.**

What has been accomplished?

- Beginning in January 2000, twenty faculty attended training on the electronic portfolio system for a total of 271 hours or 13.55 mean hours.
- The electronic portfolio was implemented with 30 preservice teachers (20 elementary and 10 secondary preservice teachers).
- The electronic portfolio system was designed to hold preservice teachers accountable for the California Standards for the Teaching Profession (CSTP) and enabled them to provide evidence that they had met those standards.

What evidence supports these accomplishments?

A focus group conducted in May of 2000 with the Teacher Preparation faculty indicated that they appreciated and valued the training they had received on the electronic portfolio. Five faculty indicated that while they had learned a great deal about the electronic portfolio, the time to actually implement it was a major problem. However, subsequent implementation of the electronic portfolio system has involved all faculty, so the time concerns seem to have been overcome.

A preservice teacher focus group indicated that the electronic portfolio showed benefits in the following areas: organization, convenience and employment marketability. Areas of concern were: logistics, difficulty in learning the electronic portfolio system and slow or no feedback from faculty and supervisors on their artifacts that were housed in the electronic portfolio system.

More specifically, the elementary preservice teachers indicated with 35% of positive responses that the electronic portfolio was useful for submitting work, 22% for viewing others' work, 19% for providing feedback. Other useful areas mentioned at a rate of about 5 to 8% each were for purposes of discussion, employment, grade requirement, and as a reflection tool.

The secondary preservice teachers indicated with 41% of positive responses that the electronic portfolio was useful as a reflection tool, 18% for employment purposes, 12% for submitting work, feedback, and viewing others' work, and 6% for grade requirement.

Major benefits mentioned by both elementary (E) and secondary (S) preservice teachers were in the areas of organization (E) 26% and (S) 41%, convenience (E) 18% and (S) 30%, general use (E) 20% and (S) 9%, and employment (E) 17% and (S) 15%. Problem areas with the electronic portfolio for both elementary and secondary preservice teachers have been identified as logistics (E) 42% and (S) 33%, difficult to learn (E) 22% and (S) 33%, and the technology itself (E) 16% and (S) 33%.

What are the plans for the future?

Initial implementation of the electronic portfolio system in the Spring semester of 2000 was very successful and led to full implementation in the Methods Block courses and student teaching in Fall semester 2000. Problems with the electronic portfolio have been addressed through extensive training of all faculty, instituting open labs for preservice teachers and faculty to address problems with the electronic portfolio, and

through consultations with clinical faculty. Full implementation of the electronic portfolio system with all preservice teachers is planned for Fall semester 2001. Faculty continue to work with the electronic portfolio system and work with the clinical faculty to integrate it into their courses.

3) **Higher education and k-12 faculty professional development workshops. Various sessions were conducted in 1999-2000 including two 3-day and numerous 2-hour workshops. Topics include curriculum revision, web page construction; use of chat room software "Tapped In;" using Internet search resources; electronic portfolios; technology to connect schools; program evaluation and technology tools.**

What has been accomplished?

The pre-survey data collected from 22 faculty using the *Self-evaluation Rubrics for Advanced Instructor Computer Use* (US Department of Education, 1998) indicated that all faculty felt at least ***somewhat comfortable*** with instructional software, information literacy skills, modification of instructional delivery, assessing student performances, individualization of instruction, professional growth and communication, research and evaluation of technology use, Internet basics, email and electronic mailing lists, the World-Wide Web, Internet search tools, news groups and chat rooms, obtaining, decompressing and using files, real-time and push technologies, webpage construction and netiquette and ethics. They felt ***moderately competent*** with 50% of the areas named, including: comfort with instructional software, modification of instruction, assessment of student performance, professional growth and communication, Internet basics, email and electronic mailing lists, the World-Wide Web, and Internet search tools.

The Teacher Technology Survey (US Department of Education, 1998) pre-assessment revealed that 100% of faculty regularly used traditional applications of technology with their students. Other, less traditional applications were used to a limited degree or not at all. The median for general computer use, word processing, Internet search engines, presentation software, and Internet use in classes was weekly. Other, less traditional applications, including graphical applications, and desktop publishing were used monthly. Databases, spreadsheets, Hypermedia, integrated learning systems, simulations, and drill and practice software were never used.

With this baseline data in mind, professional development workshops were conducted. All School of Education faculty members attended at least one professional development workshop, receiving a mean of 31.1 hours of training. Faculty chose the sessions and amount of time to invest based on their own needs, time availability and program requirements. Most faculty attended at least one session on the electronic portfolio system. Electronic portfolio training was offered in four of the five training activities. Mean number of hours of training on the portfolio attended by the faculty was 13.55.

What evidence supports these accomplishments?

The faculty focus group analysis revealed that faculty found the training in the electronic portfolio and Tapped-in quite useful. They particularly appreciated the personal attention and individual tutoring available through the project director and the two clinical faculty. The only negative aspect of learning the technology applications by faculty was the issue of time required for the training, mentioned by seven of the ten interviewees.

What are the plans for the future?

Professional development workshops are ongoing through "Tech Mondays and Fridays" and multi-day workshops. In addition, professional development sessions on Tapped In, the electronic portfolio system, webpage design and construction, discussions on "Why use technology?," scanning and digital camera, videotaping and editing, WYSIWYG in the electronic portfolio system, creating rubrics and mounting them in the electronic portfolio, electronic grade books and ClearPhone are being offered.

4) **Implemented the use of distance learning technologies, including the use of Tapped In for teacher preparation methods block seminar discussions and ClearPhone videoconferencing through the Internet.**

What has been accomplished?

Preservice teachers and faculty in Teacher Preparation Methods courses and student teaching participated in online seminars in Tapped In. They also used the electronic portfolio system to house student artifacts for their methods courses and the CSTP. Preservice teachers were encouraged to tutor K-12 students for one of their foundations courses using ClearPhone, a distance learning technology.

What evidence supports these accomplishments?

The elementary preservice teacher focus group indicated with 58% of the focus groups' responses that Tapped In has value as a tool for conducting seminars online. When discussing what was not effective about using Tapped In as a seminar tool, 33% of the comments involved logistics (difficult to navigate), 23% of the comments involved place issues (why use Tapped In when we're meeting face-to-face three days a week?), and 23% of the comments involved time issues (why use extra time for Tapped In when we're meeting face-to-face three days a week?).

The secondary preservice teacher focus group indicated with 50% of the focus groups' responses that Tapped In was entertaining, that it helped them acquire skills in technology (29%), and that it had value (14%). When discussing what was not effective about using Tapped In as a seminar tool, 33% of the comments involved place issues (why use Tapped In when we're meeting face-to-face three days a week?) 17% of the comments involved time issues (why use extra time for Tapped In when we're meeting face-to-face three days a week?), 17% of the comments involved logistics (difficult to navigate).

What are the plans for the future?

Faculty and preservice teachers continue to use Tapped In as a seminar tool in conjunction with the electronic portfolio system throughout methods courses and full-time student teaching when daily face-to-face contact is not common. Students are projecting their electronic portfolio to peers and evaluators in virtual classrooms and enjoy asking and responding to questions and comments about the artifacts placed in their electronic portfolio.

5) Curriculum revision of Teacher Preparation program. Established curriculum revision teams consisting of School of Education faculty, K-12 teachers, undergraduate faculty and administrative support personnel.

What has been accomplished?

Pre-document analysis of syllabi used in the Teacher Preparation Program revealed that technology was used in most syllabi in traditional ways, but its presence was assumed and not explicitly stated. The pre-analysis of course syllabi reflected faculty knowledge and skill in integration of technology at that time. At the pre-document analysis, faculty did not use the electronic portfolio system. In addition, the CCTC technology standards were not included and clinical faculty were not involved.

What evidence supports these accomplishments?

The faculty all agreed to integrate the California Commission on Teacher Credentialing's (CCTC) Technology Standard 20.5 throughout the Teacher Preparation Program. Forty-two courses were redesigned to include technology in teaching and learning. All syllabi were redesigned and as a result, the CCTC's Technology Review Committee approved California Lutheran University's Teacher Preparation Program as meeting the new Technology Standard.

. What are the plans for the future?

The Teacher Preparation Program will continue to revise its courses to include the use of technology, where appropriate. The participatory nature of the projects evaluation design allows faculty to respond quickly when implementation strategies work well and when they are unsuccessful. This continual response to our teaching and learning through and with technology will keep faculty ever vigilant to course revision opportunities for improving instruction and better preparing tomorrow's teachers to use technology.

All indications are that California Lutheran University's School of Education is:

- better preparing preservice teachers to use technology in teaching and learning.

- providing preservice teachers with better models and mentors for integrating technology into teaching and learning.
- maintaining State and School of Education standards for preservice teachers through the use of a web-based electronic portfolio system and distance learning technologies.

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